



COMPLETE BOUGUER GRAVITY ANOMALY MAP OF UTAH

by
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Gravimetric station
Gravimetric contour hatched in areas of closed gravity lows;
dashed where approximately located;
in small areas of closure, H = gravity high,
L = gravity low.
Complete Bouguer gravity anomaly values.
Contour interval 5 milligals.

1989

Gravity contour interval 5 milligals
Topographic contour interval 500 feet
Lambert conformal conic projection based on standard parallels 33° and 45°

Scale 1:500,000

1 inch equals approximately 80 miles

UTM GRID AND TRUE MAGNETIC NORTH
DECLINATION AT CENTER OF MAP

0°

90°

180°

270°

360°

DISCUSSION
The completion and publication of this map is a cooperative effort by (1) the Utah Geological and Mineral Survey (UGMS), (2) the United States Geological Survey (USGS), and (3) the Department of Geology and Geophysics, University of Utah (UOGG). The map is based on approximately 40,000 gravity stations collected by many individuals and organizations. Principal facts observed gravity, elevation, latitude, and longitude of the stations are from about 17,000 stations supplied by Kenneth L. Cook from the UOGG files and edited by Cook and DePangher; and about 23,000 stations supplied by Viki Bankey from the files of the National Geophysical Data Center and the USGS.

The combined gravity data set was processed by Viki Bankey. Observed gravity values were adjusted to conform to the International Gravity Standardization Net of 1971 (International Association of Geodesy, 1974), and then reduced to the simple Bouguer gravity anomaly values using the 1967 gravity formula (International Association of Geodesy, 1971) and a reduction density of 2.67 g/cm³. Standard USGS reduction equations and related equations are explained in Cook and Mabey (1982). Computer-calculated terrain corrections, assuming a rock density of 2.67 g/cm³, were made radially from each station to a distance of 167 km (100 miles) using the method of Plafiff (1977). The terrain-correction value was then added algebraically to the simple Bouguer gravity anomaly value to give the complete Bouguer gravity anomaly value for each station.

The gravity contour map was prepared on a Lambert conformal conic projection based on standard parallels 33° and 45° and a central meridian longitude of 111°20'W and a base latitude of 39°10'N. The 1989 edition of the map was prepared by Viki Bankey. The map was printed on a 25-km spacing using a computer program by William H. Wood (1981) on a standard computer (Bugs, 1974). Gridded data were contoured at a 5-milligal interval using a program by Gordon and Whiting (1982), with contour smoothing using splines under tension. Data were extended approximately 15 minutes of arc (about 25 km or 15 miles) beyond the area border to "smooth" the edges of the map.

Blank topographic maps were made in the computer. The topographic contours were added in the Ogden Valley and Road Point areas from surveys of known high quality but where the principal facts could not be located. In these two areas the contours are dashed as they are in the Best Lake area.

The position control, gravity surveying techniques used, and the compilation procedures were designed to produce complete Bouguer anomaly values accurate to within 0.5 mGal in areas of relatively low topographic relief and 1 mGal in areas of high relief. The numbers before the nearly all of the stations in the data set meet these standards.

Acknowledgments
The following individuals and organizations provided gravity data to K.L. Cook and/or the University of Utah and have given permission to use their data for the map, to include the list of principal facts of these gravity stations with all other stations used in making this map and to open the file this list of principal facts after final publication of the map.

Amoco Production Company¹
Chevron Oil Company (now Chevron USA, Inc.)²
Gulf Research and Development Company³
Humble Oil and Refining Company (now Exxon, U.S.A.)⁴
Utah Southern Oil Company (contour map)

Since June 1984, the following organizations and individuals have provided one or more gravity reads to the University of Utah to support gravity research under the supervision of K.L. Cook:

Amoco Production Company¹
Chevron USA, Inc.²
Coca-Cola Bottling Company⁵
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Base from U.S. Geological Survey Utah Base Map 1985.